November 15, 1998

Bruce Halstead, US Fish & Wildlife Service
1125 16th Street, Room 209
Arcata, CA 95521
fax (707) 822-8411
Re: Permit numbers PRT-828950 and 1157.

John Munn
California Department of Forestry
1416 Ninth Street
Sacramento, CA 95814
fax (916) 653-8957
Re: SYP 96-002

Gentlemen,

In order to keep the record straight I am mailing the hard copies of the references to both locations. Please send confirmation of receiving both my comments and the hard copies of the references.

Thank You

David Baston
110 Russell Blvd #5
Davis CA 95616

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Re: Permit numbers PRT-828950 and 1157.

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Re: SYP 96-002

Gentlemen,

I am writing to you as a member of the public regarding my concerns about the Pacific Lumber Company (PALCO) Habitat Conservation Plan/Sustained Yield Plan (HCP/SYP) and the EIS/EIR. I received a Bachelor of Science Degree from the University of California, Davis in Environmental Toxicology with a focus on water and soil chemistry. The Environmental Toxicology program is a well rounded curriculum that allows for the understanding and insight into how toxic threat (toxic insult) can effect an organism as well as an entire ecosystem. Presently I am finishing a masters in soil chemistry where the focus of my research is on the transport of pesticides in the water column. Pesticide transport can be extrapolated into acute and chronic insult in lower and upper trophic levels of the food web.

First, a few thoughts and points on the ecosystem itself that are in need of being addressed.

The main overall concern is that PALCO is under the misguided assumption that it can destroy an intricate ecosystem that has many levels of interaction and replace that ecosystem with a monoculture that is expected to have the same capacity to maintain the intricate levels of the previously destroyed ecosystem. This is simply not a realistic assumption. PALCO must address the impact of replacing a diverse ecosystem with a monoculture and its subsequent capacity or lack thereof to sustain viable populations of endangered species that previously resided in the undisturbed ecosystem. DB-1

Treatment of the food web and ecosystem components as individual entities that are capable of being maintained by constructing isolated and individual components is admitting that the concept of an ecosystem is not understood by the PALCO scientists. It is not possible to maintain a particular component of the upper trophic levels in a virtual vacuum. PALCO must explain how severe modifications of the streams' food web due to loss of aquatic plant life and some of the more sensitive aquatic fauna by toxic insult is going to be able to maintain the more fragile trophic levels. DB-2

Reduction of populations to minimally viable levels leads to genetic bottlenecks that leave the organism vulnerable to the possibilities of genetic mutation, disease, and destruction. PALCO must develop methods for determining population levels so that if continued incidental take occurs which continually reduces the viable population, there will be some sort of recourse to regenerate the population of endangered species DB-3

Logging leads to removal of litterfall and reduction of future litterfall. Removal of tree canopy and litterfall increases erosion due to increased impacts from direct rain on disturbed soil surfaces. Control of primary succession with herbicides[1] also reduces soil stability and increases potential for direct and indirect toxic insult to terrestrial and aquatic flora and fauna. A 24 hour time frame buffer between application and rain is not enough time to prevent runoff events from polluting streams. Decision for the application of the herbicides should include the information about their half lives. Application should not occur until there is significant time before a rain event for degradation to be effective in reducing the concentration of applied herbicide. DB-4

My remaining comments focus on section 3.14 of the EIS/EIR regarding herbicides. Herbicides can cause a significant level of incidental take through secondary effects on the surrounding stream ecosystem. Notations below reference the section, page, and paragraph in the EIS/EIR to which the comments are directed.

3.14 Herbicides

Section 3.14, pg.3.14-1, ¶2.

The level of incidental take cannot be accurately measured without considering the secondary effects of the herbicides on the entire ecosystem. Aquatic plant decline and death leads directly to a decline in aquatic fauna through the reduction of the food supply of herbivores and partly through the loss of macrophyte habitat (Eisler, 1989). The loss of macrophyte habitat includes breeding grounds and shelter for the aquatic fauna that supplies food for the upper trophic levels of listed species in streams e.g. coho salmon. The herbicide Triclopyr has been shown to be effective in reducing aquatic plant biomass production in aquatic habitat by up to 24% (Sprecher et al.,1998). The effects of the herbicide Atrazine on aquatic flora including phytoplankton, Alga, and Submersed vascular plants range from reduced photosynthesis (1.0 - 5.0 mg/l), reduced oxygen production, growth inhibition, and immediate decline in primary productivity and community metabolism with no recovery (500mg/L) in 53 days (Eisler, 1989). New studies must be undertaken in order to establish impact of declining aquatic flora on the food source and habitat loss for the listed species of concern within the stream as well as other unlisted species covered by the HCP. DB-5

Section 3.14.1.2, pg3.14-2, ¶2. Herbicide use in Forestry

The definition of "residual activity throughout the rest of the growing season" for a preemergent herbicide means the herbicide has a long half life in the environment. Effectiveness for the rest of the growing season means a long half life which will cause stream contamination if a rain/runoff event occurs during this growing season: long after application. This long term stability indicates that there is a possibility of long term chronic exposure of aquatic flora and fauna to such toxins during a runoff event. It is important to quantify the half life of these chemicals in these particular field uses in order to establish their effect on the rest of the ecosystem. Continuous monitoring of all flow types capable of transporting herbicides to the DB-6

1.) The terms pesticide(s) and herbicide(s) will be used interchangeably in this comment due to their interchangeable use in the PALCO HCP EIS/EIR and cited literature.

stream must be implemented PALCO, and samples verified by an outside lab to ensure that no toxic levels of herbicides will adversely impact the aquatic flora and fauna.

Section 3.14.2.2, pg3.14-4, ¶4. Regulation - Water Quality Protection.

14 years of NCRWQCB studies based upon aerial application and used for the purpose of monitoring exposure and drift do not provide a sound argument for posing little threat to water quality (no stream contamination) when the proposed mechanisms of application and therefore transport are different than aerial. PALCO intends to use hand application. Citing studies based upon aerial spraying is therefore irrelevant to PALCO's herbicide use situation. It is not reasonable to assume that drift will occur and impact a body of water when hand application is being employed. Concerns should be focused around runoff due to fog condensation (a significant factor in the hydrologic cycle in the coastal temperate rain forests: "wet coastal forests" from PALCO HCP EIS/EIR Sec. 3.14.1.1, pg 3.14-1 ¶2) and/or a rain event. These are the important elements in determining impact of herbicides in the surface waters. According to the graph in figure 3.4-1 DB-7

Climate Data for Eureka, California more than 50% (52.8%: 193 days out of 365 days) of the days of the year are foggy. Average monthly precipitation does not provide adequate information on the number of days where there might be a possibility of a runoff event that could transport herbicides to a surface water body. Light rain can mobilize herbicides from the surface of the plants, therefore it can be postulated that fog is also capable of mobilizing herbicides (Baker and Mickelson, 1994). A runoff event can include some or all of the following: overland flow, interflow, and groundwater flow as caused by the condensation of fog and/or a rain event. The sampling scheme should reflect a thorough sampling of every runoff event. Complete analysis of water and soil samples should also be conducted with an analytical method that is focused upon the specific compounds of interest (analytes). A method designed for screening purposes is not adequate for analyzing a few specific analytes. Screening methods are designed to find as many analytes as possible using one method with levels of recovery ranging from 30 to 90%. Monitoring also includes verification by outside independent labs of sampling and sample analysis including blanks, and spikes.

It is easy to dismiss a "no detect" result for an herbicide that is very water soluble, such as 2,4-D and Triclopyr. However, both of these are acids and have a complex extraction and detection method. It has been shown that Triclopyr is capable of reducing Aquatic Flora up to 24% of original biomass (Sprecher et al.,1998). Triclopyr ester (Garlon 4) was also shown to have a significant effect on two aquatic insect species at 80mg/liter (Kreutzweiser et al.,1992). It is clear that there will be a water quality problem because the studies being implemented to monitor the level of herbicide transport are inadequate or improper and will not be able to determine the true dimension of contamination without being modified. Therefore, particular methods of analysis must be developed by PALCO in order to detect the presence of the herbicides and their residues in the stream and in the soil. These methods include considerations for the amount of organic matter, pH, water hardness, and ionic strength. Since the EIS/EIR contains no data or information on sampling schemes and methods of analysis, determining actual efficacy of the methods is difficult at best. These methods must be described by PALCO and implemented in order to determine the scientific claim that "ground application as practiced on PALCO land poses little or no threat to water quality" (Sec.3.14.2.2, pg 3.14-4, ¶6). These methods should be described in the report and then be subjected to the outside scrutiny (peer review) of trained and qualified water quality scientists and toxicologists prior to dismissing their DB-8

possible impact.

Water solubility of each chemical should be specified with drinking water standards, detection limits, and LD_{50} and LC_{50} values to determine the actual environmental feasibility of using an herbicide and determining its potential impact on the ecosystem. DB-8 con.

Section 3.14.5, pg3.14-10, ¶6. Direct and Indirect Environmental Effects

There is no difference between herbicides used in forestry and those used in agriculture, Forest herbicides are the same as agricultural herbicides (comparison assumed by reference in sec. 3.14.7, pg3.14-8, ¶3. Check the pesticide use data base maintained by the state of California.) (Neary et al., 1993) and therefore the impact of these chemicals used in the agricultural setting should be used as a benchmark for their use in the forest ecosystem. Studies on the impacts of herbicide use in the forest should then be reevaluated for the effect of such chemicals on diversity and function of the ecosystem. DB-9

Section 3.14.5.1, pg3.14-11, ¶5 Herbicide Toxicity

Toxicity limits for aquatic plants is important in order to assess the impact of herbicide use on stream life stability. As previously stated decreased oxygen generation results from exposure to herbicides in the water column. (Eisler 1989). In order to adequately protect aquatic flora and fauna from the adverse short and long term effects of toxic chemicals, proposed toxicity criteria limits should be implemented such as the atrazine limits:<5.0mg/L for sensitive species of aquatic flora and <11.0mg/L for most other species of aquatic plants and animals (Eisler 1989). There is no discussion of herbicide metabolites and their possible impact on terrestrial and aquatic flora and fauna within the ecosystem. PALCO must determine if there are significant effects on aquatic flora and fauna of the ecosystem from herbicide metabolites. One method to determine the possible insult at chronic levels would be to monitor the peroxidase levels of the aquatic flora within the stream. (Sprecher et al.,1993). DB-10

Section 3.14.7, pg3.14-18, ¶3 Cumulative and long-Term Environmental Effects

The EIS/EIR states that buffer zones or the Riparian Management Zones (RMZS) are supposedly effective in minimizing the herbicide concentration reaching the stream (Neary et al., 1993). However, due to the increase in soil surface exposed to precipitation within the watershed, slope failure and/or increased sediment transport from the slope to the stream [would only be minimally affected due to the fact that the RMZS would soon be overwhelmed by the quality of material. In other words the RMZS would be ineffective at controlling the overland flow of material being transported from up slope if there were to be a heavy rain, this material would carry herbicides. Erosion of hillsides that have been logged show a greater than 10-fold increase of sediment transport when canopy and litterfall have been removed from the watershed (France, 1997). Although logging disturbs the surface of soil the soil solum becomes compacted and is the surface soil is therefore vulnerable to erosion. It has also been shown that there is minimal retention of ground or foliar applied herbicide on an undisturbed soil surface. In other words, a soil that has not been tilled and amended (undisturbed soil) does not have good herbicide retention capabilities as compared to a tilled or mulched field (Webster and Shaw, 1996; Hall et al.,1991; Klippel et al.; ,Watts and Hall, 1996; Logan et al.,1994, Klippel et al. 1997, Baker and Mickelson,1994). DB-11

It has been shown that the buffer zones or filter strips reduce overland flow carrying herbicides. These strips work well as long as the ground isn't saturated or the rate of water passing onto the filter strip does not exceed the infiltration rate of the soil. The EIS/EIR must examine whether the proposed buffer strips are adequate for this purpose. Other methods need to

be explored to control the ingress of herbicides from the hill slope into the streams. 1 DB - 11 cont.

PALCO has not substantiated it's claim that the stream ecosystem would not be significantly impacted due to their herbicide application. It is imperative that PALCO treat the Headwaters watershed ecosystem as one entity and understand that the application of herbicides will effect much more that the terrestrial flora to which they were applied. PALCO's and NCRWQCB monitoring must be changed in order to reflect the change in application methods.

Sincerely,

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